

HAWAII ADMINISTRATIVE RULES

TITLE 12 DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH

CHAPTER 234

INCLINED PASSENGER LIFTS

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Historical Note: Chapter 234 of title 12 is based on chapter 368 of the Hawaii Occupational Safety and Health Standards, Rules and Regulations. [Eff. 7/11/74; am 12/30/76; am 8/22/77; am 8/11/78; R 7/12/82]

§12-234-1 Application. (a) This chapter shall apply to all new and existing inclined passenger lifts, except that existing inclined tunnel lifts installed before June 11, 1974, shall comply with chapter 12-235.

(b) Conformity of all new installations of inclined passenger lifts with the applicable codes set forth in ASME A17.1, NFPA 70, the Uniform Building Code, equivalent standards acceptable to the department, or the provisions of this chapter shall be prima facie evidence that these installations are reasonably safe to persons and property. Existing

installations shall comply with the edition of the ASME A17.1 codes in effect at the time of installation, unless modified in this chapter.

(c) Conditions found not in conformance with applicable requirements, which the owner, user, or contractor could not reasonably have been aware of, shall be regarded as discrepancies. All discrepancies shall be satisfactorily resolved as soon as possible. When, in the opinion of the department, a discrepancy constitutes a potentially serious or imminent hazard, the department shall make an order to abate the condition within an appropriate time and may prohibit the use of the equipment until the condition is abated. Failure to correct discrepancies or failure to abate an unsafe condition within the time specified shall be deemed to be a violation. [Eff. 7/12/82; am and comp 12/6/90; am 11/5/93] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-2 Definitions. As used in this chapter:

"Diameter" means tread diameter when used in specifying sheaves, wheels, or pulleys.

"Factor of safety" means the number of times that a permissible force or load could be multiplied before the structure, machine, or device would reach its ultimate strength.

"Inclined passenger lift" means a device constructed and operated for transporting persons from one elevation to another consisting essentially of a level car or platform traveling on guide rails in an inclined plane. Devices installed indoors on stairways and utilizing chairs for carrying passengers are not considered to be inclined passenger lifts.

"Rated capacity" means the capacity established by the designer of the equipment. [Eff. 7/12/82; am 12/19/83; am 12/8/86; am and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-3 Runway enclosure. (a) Except at landing areas, runways of inclined passenger lifts shall be enclosed along each side.

(b) Runway enclosure shall extend to a height of at least 6 feet (1.8 m) above grade level or the highest working level adjacent to the runway or from the treads of adjoining stairways for platforms. Exception: Where the enclosure is placed least at 3-1/2 feet (1.1 m) from the runway the height of the enclosure shall be not less than 3-1/2 feet (1.1 m) in areas other than landing areas.

(c) Wire used for runway enclosure shall not be less than number 9AWG and open work in the enclosure shall reject a ball 2 inches (5 cm) in diameter, except where the enclosure is within 6 inches (15 cm) of moving equipment, the open work shall reject a ball 3/4 inch (1.9 cm) in diameter.

(d) An emergency exit shall be provided in the runway enclosure of an inclined passenger lift.

(e) Emergency doors or gates shall be installed in the side of the runway enclosure adjacent to the entrance in the car enclosure and shall be fitted with locks that will permit the doors to be opened from inside without a key. [Eff. 7/12/82; am and ren §12-234-3 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-4 Landing enclosure. The landing area of an inclined passenger lift adjacent to the runway shall be enclosed with substantial material at least 6 feet (1.8 m) in height with openings not larger than 3/4 inch (1.9 cm) and with an 18 inch (45 cm) return on each side of the landing enclosure or

wherever there is possibility of shear between the car and the enclosure.
[Eff. 7/12/82; am and ren §12-234-4 and comp 12/6/90] (Auth: HRS §397-4)
(Imp: HRS §397-4)

§12-234-5 Enclosure clearances. (a) No section of the runway enclosure shall be less than 3 feet (0.9 m) from the running line of the car.

(b) There shall be a clearance of not less than 3/4 inch (1.9 cm) between the sides of the car and the landing area enclosure.

(c) The minimum clearance between the car platform and the landing sill shall be 3/4 inch (1.9 cm) and the maximum permissible clearance shall be 1-1/4 inches (3.1 cm). [Eff. 7/12/82; am and ren §12-234-5 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-6 Machine rooms. (a) Safe and convenient access shall be provided to machine rooms of inclined passenger lifts from outside the runway enclosure.

(b) Machine rooms shall be substantially constructed to protect equipment from the weather. They shall be secured against unauthorized access.

(c) A minimum of 7-feet (2.1 m) head room shall be maintained in machine rooms.

(d) Machine room illumination shall be not less than 10 footcandles at floor level.

(e) Light switches and motor disconnect switches shall be located as close as possible to the lock jamb side of the machine room access doors.

(f) Machine enclosure shall provide a minimum of 12 inches (30 cm) horizontal or vertical clearances, or more if necessary, to give access to parts of the machinery that may require maintenance. [Eff. 7/12/82; am and ren §12-234-6 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-7 Machine supports and factors of safety. (a) Machinery and sheaves shall be so supported and held as to effectually prevent any part becoming displaced.

(b) The factor of safety for machine beams and their immediate supporting beams shall be 5 for steel and 7 for reinforced concrete. [Eff. 7/12/82; ren §12-234-7 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-8 Car clearances. (a) When the car is at its top landing the clear distance between the front of the car and the corresponding point of any obstruction at the upper end of the runway shall be at least the sum of the following:

- (1) The clearance between the counterweight buffer and its striking block which shall be at least 6 inches (15 cm);
- (2) The stroke of the buffer used; and
- (3) Two feet (60 cm).

(b) When the car is resting on its fully compressed buffer, there shall be a minimum clear distance of 2 feet (60 cm) between the rear of the car and the lower end of the runway enclosure. [Eff. 7/12/82; am and ren §12-234-8 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-9 Counterweight clearances. When the car is at its lower

landing, the clear distance between the upper end of the counterweight and the corresponding point of any obstruction at the upper end of the runway shall be at least the sum of the following:

- (a) The clear distance between the top of the car buffer and striking blocks which shall be at least 3 inches (7.5 cm);
- (b) The stroke of the car buffer used; and
- (c) Six inches (15 cm). [Eff. 7/12/82; am and ren §12-234-9 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-10 Landing doors or gates. (a) At each landing area of an inclined passenger lift the opening providing access to the car shall be protected by a door or gate.

(b) Landing doors or gates shall be at least 6 feet (1.8 m) in height; shall be either solid or of open work construction rejecting a ball 1/2 inch (1.25 cm) in diameter.

(c) Landing doors or gates shall be equipped with a locking device which will prevent the opening of a door gate if the car is not within the landing zone, and the starting of the car if the door or gate is not closed.

(d) The maximum distance between the runway side of the landing door and the runway side of the landing sill shall not exceed 4 inches (10 cm). [Eff. 7/12/82; am and ren §12-234-10 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-11 Landing sills. Landing sills for inclined passenger lifts shall be constructed and maintained so that persons will not readily slip and fall. The sills shall be flush with adjacent floor surfaces. [Eff. 7/12/82; ren §12-234-11 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-12 Guide rails. (a) Guide rails for inclined passenger lifts shall be rigidly fixed and supported in proper alignment to withstand the loads likely to be imposed upon them by the car or counterweight when safeties are applied.

(b) Guide rails shall be constructed of metal. [Eff. 7/12/82; ren §12-234-12 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-13 Car enclosure. (a) Inclined passenger lift cars shall have metal frames and metal outside frames or platforms.

(b) Cars shall be enclosed on the sides with solid or perforated materials to a height of 6 feet (1.8 m) and if perforated materials are used, the opening shall reject a ball 3/4 inch (1.9 cm) in diameter.

(c) Car enclosure shall be metal, wood or other suitable material of such strength and rigidity that it will not deflect more than 1 inch (2.5 cm) when subjected to a horizontal force of 75 pounds (34.1 kg) applied at any location.

(d) Each entrance to an inclined lift car shall be provided with a door or gate covering the full width and height of the opening.

(e) Car doors or gates may be solid or have openings that will reject a ball 3/4 inch (1.9 cm) in diameter.

(f) Each car door or gate shall be of the sliding type or the swing type opening into the car.

(g) Inclined passenger lift car doors or gates shall be equipped with a contact that shall prevent operation of the car unless the door or gate is

within 2 inches (5 cm) of being fully closed. Where the car at any point in its travel is more than 6 feet (1.8 m) from the ground, contact locks properly zoned shall be provided on the car gate.

(h) In addition to a capacity plate that shall be posted in the car of every inclined passenger lift, a data plate specifying manufacturer, rated speed, and number and size of ropes shall also be attached to the car.

[Eff. 7/12/82; am and ren §12-234-13 and comp 12/6/90] (Auth: HRS §397-4)
(Imp: HRS §397-4)

§12-234-14 Safeties and safety devices. (a) Every inclined passenger lift shall have a car safety that shall be applied automatically when a governor driven by the movement of the car exceeds a predetermined maximum speed.

(b) The car safety shall be capable of stopping and sustaining the car with the contract load.

(c) Cars of inclined passenger lifts shall be provided with a device that will prevent the car from leaving the guide rails. [Eff. 7/12/82; ren §12-234-14 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-15 Car speed governors. (a) The car speed governor shall be set to cause the application of the safety at a speed not more than 40 per cent and not less 15 per cent above the contract speed of the car.

(b) Car speed governors shall be equipped with a data plate specifying the manufacturer, the rated speed, and the rated tripping speed.

(c) On inclined passenger lifts every car safety shall be provided with a switch operated by the car safety mechanism when the safety is applied.

(d) When operated, the car safety mechanism switch shall remove power from the driving machine motor and brake before or at the time of application of the safety.

(e) The car safety mechanism switch shall be designed to prevent automatic reset on release of safeties. [Eff. 7/12/82; ren §12-234-15 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-16 Machines. (a) Drums and sheaves shall be of cast iron or steel and shall have finished grooves which may be faced with material other than iron or steel to provide sufficient traction.

(b) The radius of U-grooves shall be approximately 1/32 inch (1.6 mm) larger than the radius of the ropes.

(c) The diameter of sheaves or drums for hoisting ropes shall be at least 40 times the diameter of the ropes used.

(d) The factors of safety based on static loads to be used in the design of inclined lift hoisting machines shall be at least 8 for wrought iron or wrought steel and 10 for cast iron, cast steel, or other materials.

(e) Set screw fastenings shall not be used instead of keys or pins except when the connection is not subject to torque.

(f) The use of friction gearing or clutch mechanisms for connecting drums or sheaves to the main driving gear is prohibited.

(g) The installation of belt or chain driven machines to drive an inclined passenger lift is prohibited.

(h) The use of worm gearing with cast iron teeth or the use of cast iron pinion or spur gearing is prohibited.

(i) Inclined passenger lift machines shall be equipped with

electrically released brakes capable of stopping and holding the car with its full-rated load.

(j) Brakes shall be applied automatically by springs or gravity when the operating device is at the "stop" position.

(k) Brakes shall not be released until power has been applied to the motor. [Eff. 7/12/82; am and ren §12-234-16 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-17 Terminal stopping and safety devices. (a) Inclined passenger lifts shall be provided with upper and lower normal terminal stopping devices arranged to stop the car automatically within the top and bottom over travel limits, independently of the operating devices, the final terminal stopping device and the buffers.

(b) Inclined passenger lifts shall be provided with upper and lower final terminal stopping devices arranged to stop the car and counterweight automatically from contract speed within the top clearance and the bottom over travel, independently of the operating device, but with the buffers operative.

(c) Final limit switches shall be set to operate with the car as close to the terminal landings as practical, without interfering with normal operation and shall be set to open on contact with the buffer.

(d) Final limit switches shall be located in the runway and be operated by the movement of the car.

(e) The final terminal stopping device shall act to prevent movement of the car in both directions.

(f) Normal and final terminal stopping devices shall not control the same switches on the controller unless two or more separate and independent switches are provided, two of which shall be closed to complete the motor and brake circuit in each direction of travel. When 2-phase or 3-phase alternating current is used to operate the inclined passenger lift, the controller switch shall be of the multiple type.

(g) Normal and final terminal stopping switches shall be of the enclosed type.

(h) The cams for operating the terminal stopping switches shall be of metal and shall be so located and of a sufficient length to maintain the switches in the open position when the car has reached its maximum travel at either end of the runway.

(i) Inclined passenger lifts utilizing machines of the winding drum type shall have, in addition to the final limit switches located in the runway and operated by the movement of the car, final terminal stopping switches on the machine.

(j) Chain, rope, or belt-driven machine terminal stopping devices shall not be used for inclined passenger lifts having winding drum machines.

(k) Inclined passenger lifts having winding drum machines driven by 2-phase or 3-phase AC motor shall have the main line circuit to the motor and the brake directly opened either by contacts in the machine stop motion switch or the runway limit switches. The runway limit switches may be operated either by a cam attached to the car or the up travel limit switch may be operated by a cam attached to the car and the down travel limit switch may be operated by a cam attached to the counterweight; and the opening of the contact shall take place before or coincident with the opening of the final terminal stopping device and shall prevent movement of the machine in either direction. This rule shall not apply to inclined passenger lift machines with

AC motors and DC brakes and DC main line or potential switches controlled by final limit switches located in the runway.

(1) Inclined passenger lifts having winding drum machines shall be provided with a slack cable device which will cut off the power and stop the machine if the car is obstructed in its descent.

(m) Slack cable switches shall be so constructed that they will not automatically reset when the slack in the cable is removed.

(n) Electric slack cable switches shall be of the enclosed type.
[Eff. 7/12/82; ren §12-234-17 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-18 Operation and control. (a) The controls of an inclined passenger lift shall be so constructed that:

- (1) It is impossible to start the car unless all runway doors are closed and in a position to be locked when a car leaves a landing; and
- (2) After the car has started for a given landing, it is impossible for an impulse to be given from any landing to reverse direction of the car until it has reached the destination corresponding to the first impulse.

(b) Where metal to metal contacts, gravity or spring opened, or a combination of the two are used on controller switches for stopping inclined passenger lift machines, at least two independent breakers separately operated shall be provided.

(c) Breaking the circuit to stop an inclined passenger lift at the terminal shall not be solely dependent upon the operation of springs in tension or the completion of another electric circuit. If springs are used, they shall be in compression.

(d) The interruption of the electric circuit shall prevent the movement of the car.

(e) The use of control systems that depend on the completion or maintenance of an electric circuit for the following is prohibited:

- (1) The interruption of the power and for the application of electromechanical brakes at the terminals;
- (2) The operation of safeties; or
- (3) The closing of a contactor by an emergency stop button.

(f) Every inclined passenger lift shall be provided with a stopping device which can be operated from the car. When operated, the device will cut off power to the driving machine and set the brake. [Eff. 7/12/82; ren §12-234-18 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-19 Limits of speed. The maximum speed for inclined passenger lifts shall not exceed 100 feet (30.3 m) per minute during adjustments, maintenance, inspection and repair. [Eff. 7/12/82; am and ren §12-234-19 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-20 Ropes. (a) The safety factor based on static loads for car and counterweight ropes shall be at least 7.

(b) The minimum number of hoisting ropes shall be three for traction machines and two for winding drum machines.

(c) A hoisting rope less than 1/2-inch (1.2 cm) diameter shall not be used.

(d) The repair or lengthening of a car or counterweight rope by splicing is prohibited.

(e) All ropes anchored to a winding drum shall have not less than 1-1/2 turns of rope on the drum when the car or counterweight has reached the extreme limit of its travel.

(f) When the ropes are fastened inside a winding drum, they shall pass around the shaft before being fastened, or be fastened to a clevis passing around the shaft in cases where the shaft revolves in an opposite direction to the drum. The ends of ropes shall be secured by clips or by individual tapered babbitted sockets.

(g) Ropes shall be inspected and replaced as required by item 103.4 of ASME A17.2. [Eff. 7/12/82; am 12/19/83; am and ren §12-234-20 and comp 12/6/90; am 7/6/98] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-21 Fastening car and counterweight ends of rope. (a) The car and counterweight ends of rope shall be fastened by individual tapered babbitted sockets or by clip fastenings.

(b) If socketed rope fastenings be used adjustable shackle rods shall be provided to attach ropes to cars and counterweights in such a manner that all portions of the rope except the portion in the socket shall be readily visible.

(c) The clips used shall be of the Crosby type with single or double saddles grooved to suit rope used and shall have drop forged bolts.

(d) A minimum number of clips to be used on each rope end shall be:

(1) Three clips for ropes not over 5/8-inch (1.6 cm) diameter.

(2) Four clips for ropes not over 3/4-inch (1.9 cm) diameter.

[Eff. 7/12/82; am and ren §12-234-21 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-22 Rope tags. (a) Every person installing a hoisting, car counterweight, or governor rope shall provide a metal or plastic tag legibly showing the date of installation, the grade of material, the diameter, the ultimate strength and notice that the rope is preformed or non-preformed.

(b) The tag required above shall be attached to the rope at the car, counterweight, or governor. [Eff. 7/12/82; ren §12-234-22 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-23 Buffers. (a) Spring or oil buffers shall be provided for the car and counterweight at the lower end of the runway.

(b) Buffers shall be mounted on substantial supports and shall withstand without damage the impact of the fully loaded car or counterweight at contract speed. [Eff. 7/12/82; ren §12-234-23 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-24 Electrical equipment. The installation of all electrical equipment used in connection with an inclined passenger lift shall comply with the requirements of NFPA 70. [Eff. 7/12/82; ren §12-234-24 and comp 12/6/90; am 7/6/98] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-25 Inspections and tests. (a) On completion of every new or altered inclined passenger lift installation, tests shall be made with contract load in the car under supervision of the department before the

equipment is placed in regular service. These tests shall be repeated at intervals not exceeding 60 months.

(b) In the test required above, brakes, limit switches, buffers, car safeties, speed governors and all other safety devices shall be caused to function.

(c) Prior to placing any new or altered inclined lift into regular service a thorough examination of the entire installation shall be made by the department to insure conformity with these rules.

(d) Failure to any safety device to function properly under test or noncompliance with any part of this chapter shall be cause to withhold clearance for operation until satisfactory repairs or alterations are made.

(e) When an inspector discovers an unsafe condition in connection with an inclined passenger lift that is not specifically addressed in this chapter, the inspector shall issue an order requiring the owner to make all changes, improvements, or repairs as may be necessary to remove hazards to persons or reduce the possibility of accidents.

(f) Each inclined passenger lift shall be inspected twice each year by the department. [Eff. 7/12/82; am 12/19/83; am and ren §12-234-25 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-234-26 Operating permit. An operating permit shall be issued by the department on the basis of the report of the acceptance inspection and each annual inspection. The operating permit shall be posted in a conspicuous place near the inclined passenger lift. [Eff. 7/12/82; ren §12-234-26 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)